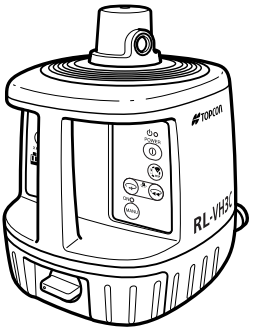
TOPCON



INSTRUCTION MANUAL

ROTATING LASER

RL-VH3C

Declaration of Conformity

Model Number:	RL-VH3C remote control compatible model
Trade Name:	TOPCON CORPORATION
Responsible party:	TOPCON LASER SYSTEM, INC.
Address:	5758 West Las Positas Blvd., Pleasanton, CA 94588, U.S.A.
Telephone number:	925-460-1300

This device complies with Part 15 of the FCC Rules, Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Foreword

Thank you for purchasing the Topcon RL-VH3C Rotating Laser.

It is one the world's most advanced lasers.

To quickly and effectively use the RL-VH3C, please read these brief instructions carefully; and keep them in a convenient location for future reference.

Handling Precautions

1 Vibration and Impact Protection

When transporting the instrument, provide protection to minimize risk of severe vibration or impact. Severe vibration or impacts may affect beam accuracy.

2. Laser Scanning Interference

Particular reflective surfaces such as mirrors and some glass surfaces, can cause beam reflection that in very rare circumstances can interfere with the laser scanning function. If this should happen, simply change the location of the laser or cover the reflective surface.

Caution:

Use of adjustment controls or performance procedures other than those specified herein may results in hazardous radiation exposure.

Safety Information

In order to encourage the safe use of products, to prevent damage to properties, and to prevent any danger to the operator and to others, important warnings are placed on the products and inserted in the instruction manuals.
We suggest that everyone understand the meaning of the following displays and icons before reading the “Safety Cautions” and text.

Display	Meaning
⚠ **WARNING**	Ignoring or disregard of this display may lead to death or serious injury.
⚠ **CAUTION**	Ignoring or disregard of this display may lead to personal injury or physical damage to the instrument.

Injury refers to hurt, burn, electric shock, etc.
Physical damage refers to damage to equipment and structure or furnishings.

Safety Cautions

⚠ WARNING
• **There is a risk of fire, electric shock or physical harm if you attempt to disassemble or repair the instrument yourself.** This is to be carried out by TOPCON or an authorized dealer, only!
• **Laser beam can be dangerous, and can cause eye injury if used incorrectly.** Never attempt to repair the instrument yourself.
• **Cause eye injury or blindness.** Do not stare into beam. (RL-VH3C standard model) Do not stare into beam or view directly with optical instruments. (RL-VH3C remote control compatible model)
• **Risk of fire or electric shock.** Do not use a wet battery.
• **May ignite explosively.** Never use an instrument near flammable gas or liquid matter, and do not use in a coal mine.
• **Battery can cause explosion or injury.** Do not dispose in fire or heat.
• **The short circuit of a battery can cause a fire.** Do not short circuit battery when storing it.

⚠ CAUTION
Use of controls or adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.
Let the laser beam reach the aimed object or the target without anybody else in the laser beam path. When operating in an open area, avoid radiating laser beam at eye level. It is quite possible for the beam to enter into one's eyes, and it is possible to lose visual sight temporarily, and lose one's caution and awareness of other dangers - avoid glaring beam.
Do not allow skin or clothing to come into contact with acid from the batteries, if this does occur then wash off with copious amounts of water and seek medical advice.
Risk of injury by dropping the instrument or case. Do not use a carrying case with damaged belts, grips or latches.
It could be dangerous if the instrument falls over, please check that you fix the instrument to the wallmount or tripod.
Risk of injury by dropping a tripod and an instrument. Always check that the screws of tripod are tightened.
Please note that the tips of tripod can be hazardous, be aware of this when setting up or carrying the tripod.

User

Wear the required protectors (safety shoes, helmet, etc.) when operating.

Exceptions from Responsibility

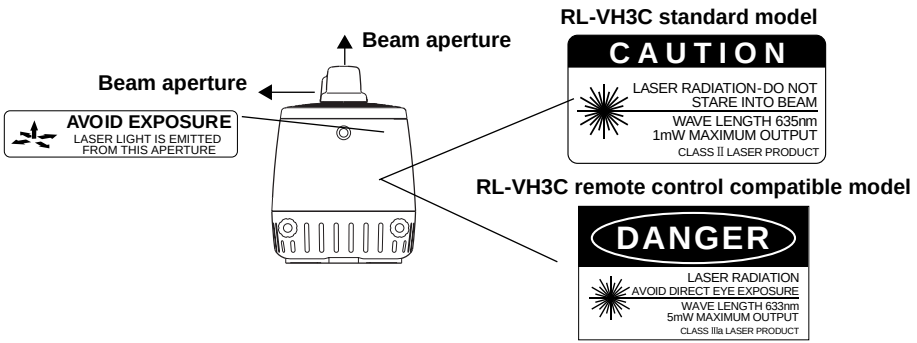
1) The user of this product is expected to follow all operating instructions and make periodic checks of the product's performance.
2) The manufacturer, or its representatives, assumes no responsibility for results of a faulty or intentional usage or misuse including any direct, indirect, consequential damage, and loss of profits.
3) The manufacturer, or its representatives, assumes no responsibility for consequential damage, and loss of profits by any disaster, (an earthquake, a fire, an accident, storms, floods, an act of a third party and/or a usage other than under normal conditions.)
4) The manufacturer, or its representatives, assumes no responsibility for any damage, or loss of profits due to a change of data, loss of data, an interruption of business etc., caused by using the product or an unusable product.
5) The manufacturer, or its representatives, assumes no responsibility for any damage, or loss of profits caused by usage other than those usages explained in the user manual.
6) The manufacturer, or its representatives, assumes no responsibility for damage caused by wrong movement, or action due to connecting with other products.

Laser Safety

This product projects a visible laser beam during operation. This product is manufactured and sold in accordance with “Performance Standards for Light-Emitting Products” (FDA/BRH 21 CFR 1040) or “Radiation Safety of Laser Products, Equipment Classification, Requirements and User’s Guide” (IEC Publication 825) provided on the safety standards for laser beam.

As per the said standard, RL-VH3C standard model is classified as “Class 2 (II) Laser Products” and RL-VH3C remote control compatible model is classified as a “Class 3A (IIIA) Laser Product”. These are simple products to operate and does not require training from a laser safety officer. In case of any failure, do not disassemble the instrument. Contact TOPCON or your TOPCON dealer.

Labels



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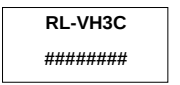
Standard System Components

1 RL-VH3C Instrument ..... 1pc.
2 Magnetic Target ..... 2pc.
3 Wall Mount (Model 1C) ..... 1pc.
4 D-size dry cells ..... 4pcs.
5 Carrying case ..... 1pc.
6 Calibration decals 1set
7 Instruction manual ..... 1vol.

Please make sure that all of the above items are in the box when you unpack.
Additional Magnetic Scanning Targets may be included in some markets.

Remote Control Option

There are two RL-VH3C models, standard and remote control compatible.
Standard models cannot be operated using the optional RC-30 remote controller (see page 36).
Remote control compatible models are designated by the letter "R" following the model name on the serial number tag as shown below.

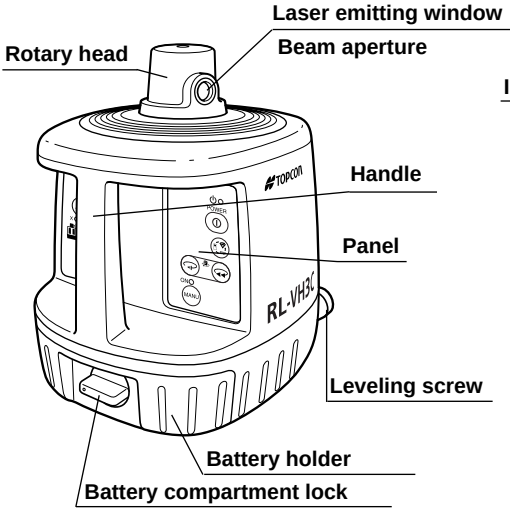


Standard model

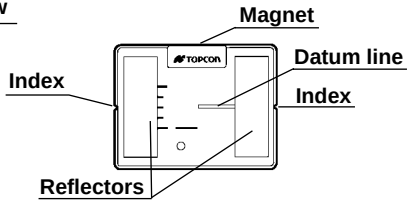
Remote control compatible

Nomenclature and Functions

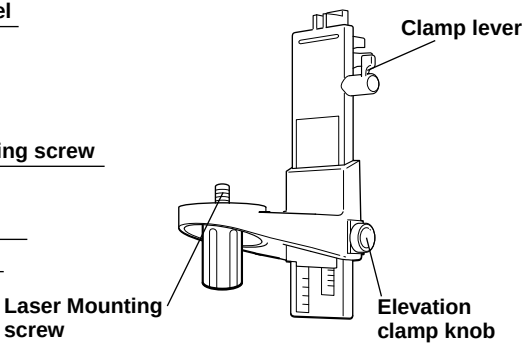
RL-VH3C



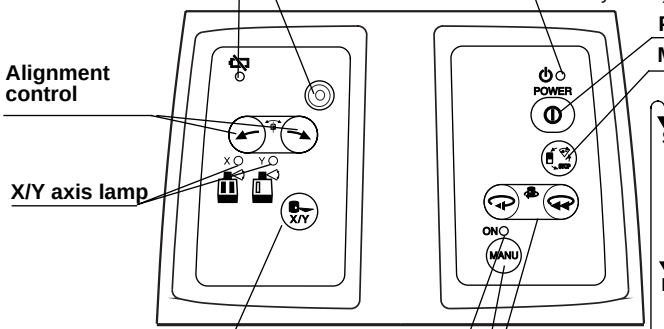
Magnetic Scanning Target



Wall Mount 1C



Control Panel



Low battery alert

Circular level for vertical operation

Leveling lamp

Flashing: Laser is leveling
On: Auto-leveling is completed
(RL-VH3C remote control model has standby mode)

Power switch

Mode switch control

Laser mode is switched alternately as follows.

Scan mode

Head rotates slowly, searching for Magnetic Scanning Target. When target is placed in beam path, laser rapidly scans back and forth on target.

Laser sensor mode

Laser sensor mode
Head rotates at 300 rpm.
Use this setting when using an optional electronic laser sensor such as the Topcon LS-70.

Laser pointing mode

Head stops rotating and the beam can be positioned by manually turning the head.

Alignment control

X/Y axis lamp

X/Y axis selection key

Select X or Y axis for manual beam sloping.

Manual mode lamp

ON: Manual leveling mode
OFF: Auto-leveling mode

Speed control

With 'Laser Pointing Mode' selected, the rotation speed of the head can be changed.

Auto/manual leveling control

ON/OFF of Auto-leveling. To turn off the auto-leveling, press this key twice. To turn on the auto-leveling again, press this key once.

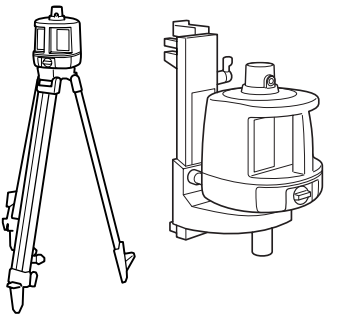
Preparation For Use

Battery Installation

For battery placement or replacement instructions, see Maintaining Power Sources section, page 19.

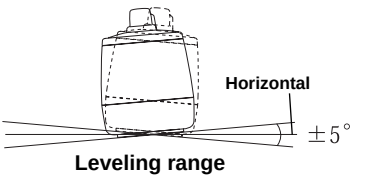
Instrument Set-up Procedure

Horizontal Rotation



1 Set the instrument on any smooth surface that is within ±5° of true level. The RL-VH3C auto-level system will not function if the unit is placed more that 5° out of level. For best operation, it is recommended that it be mounted to a tripod or the Topcon Wall Mount Model 1C (provided).

Slope can be set in both axes, X and Y. See "Setting Slope" section, page 16.

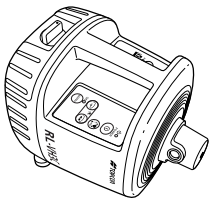


Leveling range

Vertical Rotation

1 Place the instrument on its back as shown in the illustration.

2 Turn the leveling screw on the instrument until the bubble is centered in the circular level vial.



Battery Warning Lamp

Flashing : The power is low
ON Solid: Dead batteries
Replace the batteries with new ones.

Auto-leveling lamp

Flashing : Auto-leveling is in process. When automatic leveling is almost complete, the flashing rate will be slow. The head will not rotate and the laser beam will not emit during the auto-leveling process.

ON Solid: Auto-leveling is complete.
The rotary head is active and emits the laser beam.

To turn automatic leveling off

To turn OFF the auto-leveling function (manual mode), press the Auto-Manual control pad twice in quick succession. The manual mode indicator light will illuminate. The instrument can be positioned in any direction, the laser beam remains on and the head will rotate. IMPORTANT: In manual mode, the laser beam will not shut off if disturbed! To return to Auto-leveling mode, press Auto/Manual control pad once.

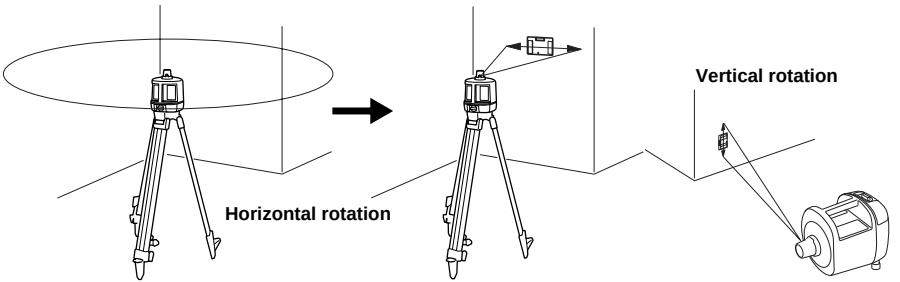
Operation

Scanning Mode

In scan mode, the laser rotates slowly, "searching" for the Magnetic Scanning Target. When the target is properly placed in the beam path, the laser beam will scan rapidly back and forth on the target and "track" the target as it is moved in its path.

1 To change to scanning mode when operating, press the Mode Control Pad.

2 To initiate target scanning, place the Magnetic Scanning Target in the beam path with the reflective strips facing toward the laser.



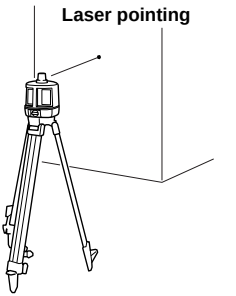
3 To end target scanning and resume searching beam, remove target from beam path.

Laser Sensor Mode

For long range or outdoor applications, the instrument can be used with an optional electronic laser sensor. The Topcon models LS-70B or LS-70A are recommended. Press the Mode Control Pad to select Laser Sensor Mode. The beam rotates at 300 rpm in this setting.

Laser Pointing Mode (stop)

This mode stops rotation and allows the laser beam to be pointed by manually rotating the head. Press the mode control pad to select Laser Pointing Mode. Beam rotation stops in this mode.



Changing rotation speed

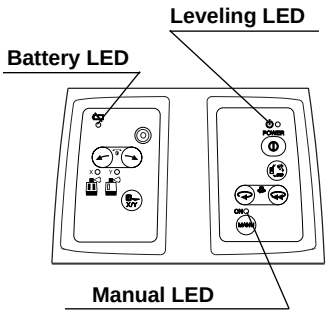
(only available in Laser Pointing Mode)

After selecting Laser Pointing mode, press either Speed Control pad to change rotation speed. The right pad increases the rotation speed. The left pad reduces the rotation speed.

Height Alert function

When auto-leveling is active, this function prevents the instrument from operating if it is disturbed. This serves as a reminder to the user that to insure accurate control, the height of the beam should be re-checked after the unit has been disturbed.

1 To activate the Height Alert function, depress and hold the left Alignment control pad (see page 10) on the control panel while turning on the instrument by pressing the Power control pad. The three LEDs (Leveling, Manual, Battery) will flash at the same time for three seconds.



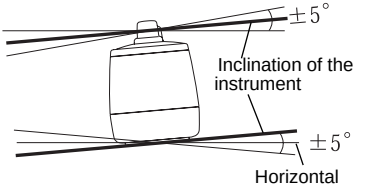
2 When this function is active and the unit is disturbed, three visible LEDs will rapidly flash.

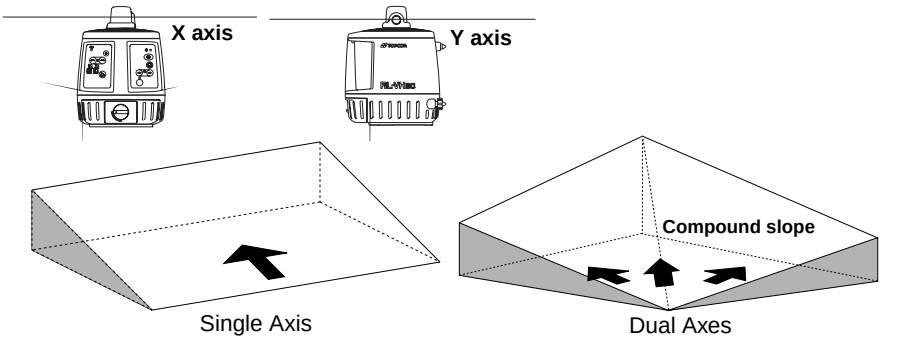
3 To re-activate auto-leveling and check the beam height, turn the unit off, then on again by pressing the Power control pad twice. After auto-leveling is complete, check the beam height to confirm it has not changed.

4 The Height Alert function is now inactive. To re-activate, turn unit off and repeat step 1.

Setting Slopes

The laser beam can be manually sloped in either the X or Y axis (single slope) or both axes (compound slope).Using the Slope Control pads (see page 10), the beam can be electronically raised or lowered 5 degrees above or below the inclination of the instrument. This means that slopes up to 5 degrees can be obtained if the instrument is set up on a level surface. For slopes greater than 5 degrees, the instrument must be manually positioned to within 5 degrees of the slope desired.





How to set slopes

1 Turn the instrument on by pressing the Power control pad. Auto-leveling will start.

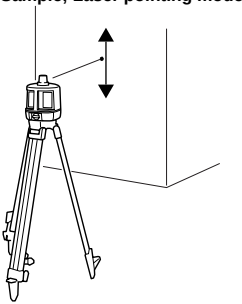
2 Press the X/Y Axis Selection control pad once after auto-leveling is complete (see page 10). The X axis lamp will flash. To change to Y axis, press the X/Y pad once again. Pressing the X/Y pad toggles between X and Y axis selection.

3 Select Laser Pointing mode to stop beam rotation and manually align the beam over the X axis (see illustration on previous page).

4 To move the laser beam up or down, press and hold the right or left Alignment Control pad. The Manual mode lamp will illuminate. The flashing X axis lamp will change to solid after several seconds indicating slope has been entered in the X axis.

5 To set a compound slope, repeat steps 2 to 4 for the Y axis.

Sample; Laser pointing mode



Move the beam up or down by pressing the right or left alignment keys

To cancel slope settings

Press the Manual Mode pad. The instrument returns to auto-leveling mode.

Setting slope in Y axis

Raise or lower the laser beam by pressing the right or left Alignment Control pad.

Line Control (manual vertical beam alignment)

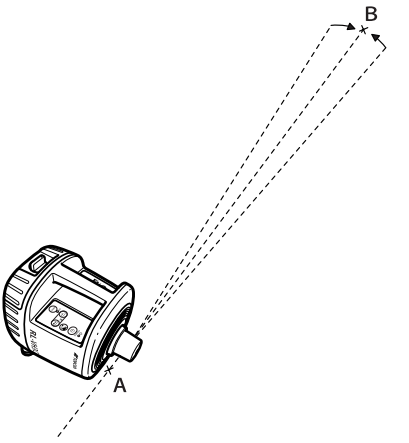
1 Position the instrument for vertical operation as instructed on page 12.

2 Press the Power Control pad to turn unit on. When auto-leveling is complete, the laser beam will be emitted.

3 Select the Laser Pointing operating mode and using the laser beam, position the unit so the beam aperture is directly over point A and is roughly in line with point B (see illustration).

4 Rotate the head so the beam is pointing toward point B. Press either one of the Alignment Control pads to move the beam right or left until it is precisely aligned to point B.

5 Select the operating mode using the Mode Control pad best suited for your application.



Note	• While an alignment control pad is pressed the auto-leveling beam shut-off will not operate. • To aid in beam alignment, Vertical Alignment targets are available from Topcon.

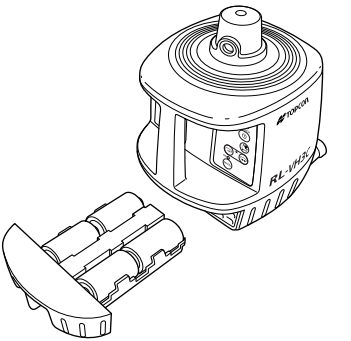
Maintaining Power Sources

How to replace dry batteries

1 Remove the battery cover by turning the battery compartment lock to “OPEN”.

2 Remove the old batteries and replace with four (4) new “D” cell alkaline batteries making sure each is placed in the proper direction as indicated.

3 Replace the battery cover and turn the knob to “Lock”.



Note	• Replace all 4 batteries with new ones. • Do not mix old batteries and new ones.

Checking and Adjusting

There are three areas of performance the user should check periodically.

Horizontal Calibration

Horizontal Rotation Cone

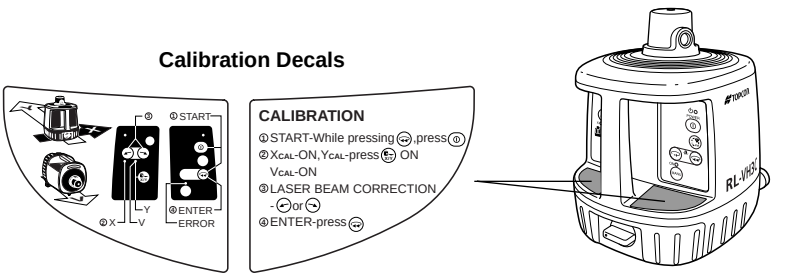
Vertical Calibration

The Horizontal Calibration and Vertical Calibration can be easily checked and, in most cases, adjustments can be made by the user. Horizontal Rotation Cone can be checked by the user, if an error is found, adjustments must be made by a Topcon service facility.

Attaching the calibration decals

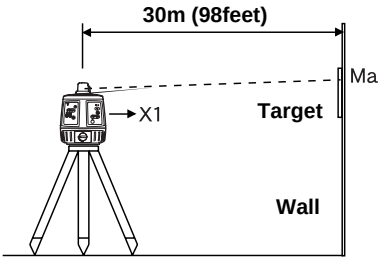
Before calibration, attach the calibration decals to the instrument as shown below. The calibration decal shows the calibration function of certain control pads on the control panel.

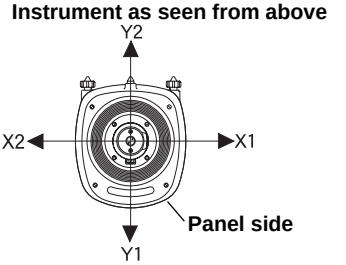
Calibration Decals



Horizontal Calibration

(1)Checking Calibration



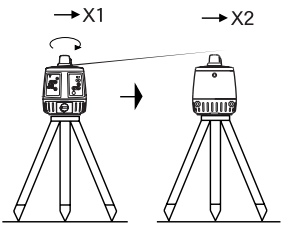


1 Set up a tripod 30m(98ft) from a wall. Mount the instrument on the tripod, facing the X1 toward the wall.

2 Turn the unit on and allow auto-leveling to complete.

3 Place a piece of paper on the wall. Detect a laser position on the wall with target and mark it. Turn the instrument off.

4 Loosen the tripod screw, rotate the instrument 180 degrees.



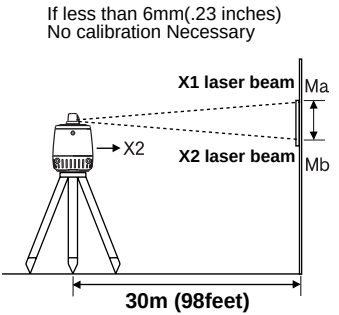
Note	• When rotating the instrument, avoid knocking it off level.

5 Turn the unit on again and allow auto-leveling to complete.

6 Make a new mark (Mb) where the laser beam strikes the paper.

7 Measure the distance between the first mark (Ma) and the second mark (Mb). No calibration is necessary if distance is within 6mm (.23 inches).

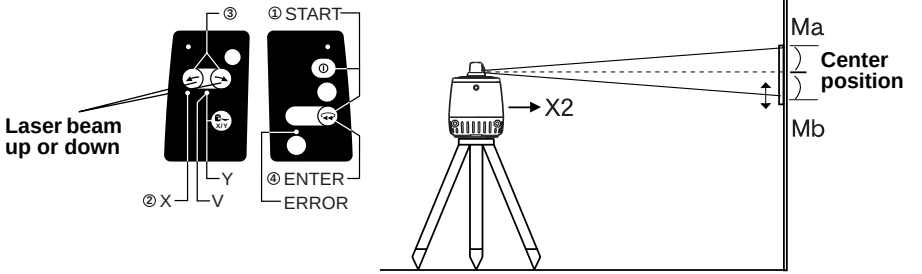
8 Repeat procedure for the Y axis.



(2) Adjusting Calibration

If the distance between either set of marks is more than 6mm (.23 inches) but less than 25mm (1 inch), turn the unit off by pressing the [START] pad once and using the following procedure. Confirm that unit has shut off before beginning the procedure.
(In steps 2 and 3, use of optional RC-30 remote control can be helpful. See page 34.)

1 While pressing the [ENTER] key, press the [START] key. This activates the X axis calibration mode. Confirm that the [X] LED is lit.



2 By pressing the right or left Alignment Control pad, move the X2 (Mb) laser beam up or down until its centered between marks Ma and Mb.

3 When the beam is precisely centered, press the [ENTER] key. The [X] LED will flash.

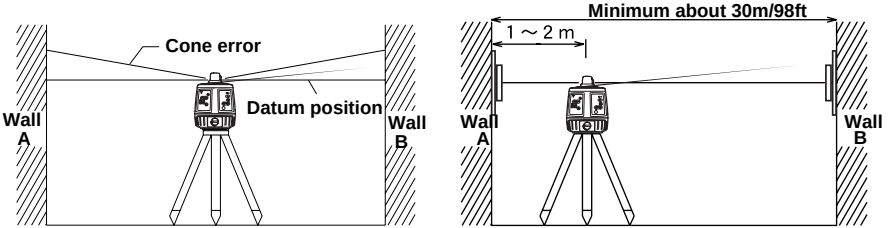
4 When the flashing stops, the X axis calibration adjustment is made and power is turned off.

Note	• If the calibration is greater than the adjustment allows, the error LED will start flashing. If this occurs, contact your Topcon dealer.

For Y axis calibration, turn the unit as instructed in step 1 above then press the X/Y Axis Selection pad. Confirm that the [Y] LED is lit, then repeat steps 2 to 4 for the Y axis. Repeat the checking procedure to confirm proper calibration has been made.

Horizontal Rotation Cone Error

Perform the following check after completing "Horizontal Calibration" on the previous page.



1 Set up the laser centered between two walls approximately 30m (98 ft) apart. Orient the instrument so one axis, either X or Y, is facing the walls.

2 Locate and mark the position of the rotating laser beam on both walls using the target.

3 Turn off the instrument and move the instrument closer to wall A (1m to 2m /3 ft to 6 ft). Do not change the axis orientation of the instrument. Turn the instrument on.

4 Again locate and mark the position of the rotating laser beam on both walls using the target.

5 Measure the distance between the first and second marks on each wall.

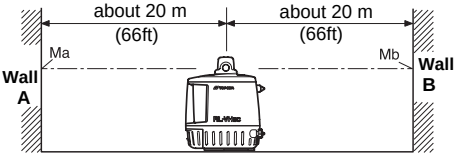
6 If the difference between each set of marks is less than 3mm (1/8 of an inch), no error exists.

Note	• If the error is grater than 3mm (1/8 of an inch), contact your Topcon dealer.

Vertical Calibration

Perform the following check after completing "Horizontal Calibration" on the previous page.

(1)Checking



1 Set up the instrument half way between 2 walls a minimum of 40m away from each other. (The instrument can be facing either direction X or Y. And no tripod is used.)

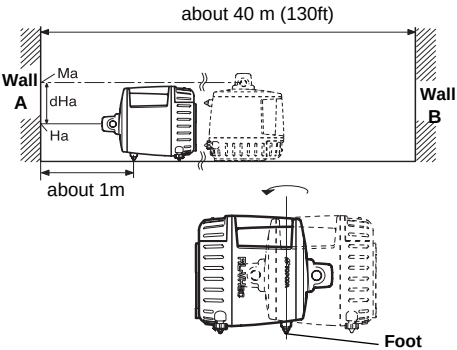
2 Turn the power switch on.

3 Place a piece of paper on each wall (A and B).
Mark the horizontal laser positions (Ma and Mb) on each wall using target.

4 Turn the power switch off. Position the instrument for vertical operation (see instruction on page 12) with the rotary side directly facing wall A (see illustration). Make sure the unit is level by checking the circular level vial. Use the leveling screw to adjust if necessary.

5 Turn the power switch on. (Laser beam should be in scanning mode.)

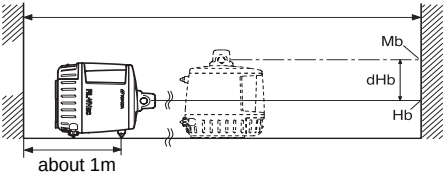
6 Mark where the split beam emitted from the top of the rotary head strikes wall A (Ha). Measure the distance (dHa) between marks Ma and Ha.



7. Without moving the position of the front foot, pivot the instrument so the rotary head is now facing wall B.

8 Mark where the split beam emitted from the top of the rotary head strikes wall B (Hb). Measure the distance (dHb) between marks Mb and Hb.

9 Compare the two measurements dHa and dHb. If the difference between the two measurements is less than 4mm (5/32 of an inch), no adjustment is necessary. Otherwise, adjust as follows.

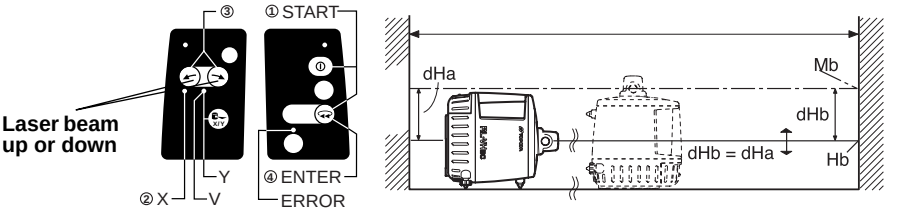


(2)Adjusting Calibration

Turn the unit off by pressing the [START] pad once. Confirm that unit has shut off before beginning the following procedure.(In step 2 and 3, optional RC-30 remote control is helpful.)

1 Without moving the unit, press the [ENTER] and [START] keys simultaneously.

2 Press either the right or left key on the Alignment Control pad to move the laser beam up or down on wall B until the measurement for the distance dHb is the same as the measurement dHa on wall A.



3 When the beam is positioned so the two measurements are the same, press the [ENTER] key. The [V] LED will flash.

4 When the flashing stops, the vertical calibration adjustment is made and power is turned off.

Note	• If the calibration is greater than the adjustment allows, the error LED will start flashing. If this occurs, contact your Topcon dealer.

Repeat the checking procedure to confirm proper calibration has been made.

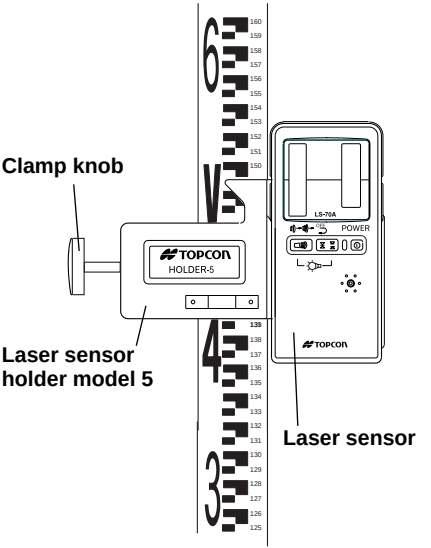
Storage Precautions

Always clean the instrument after use.
Use a clean cloth, moistened with a neutral detergent or water. Never use an abrasive cleaner, ether, thinner benzene, or other solvents.

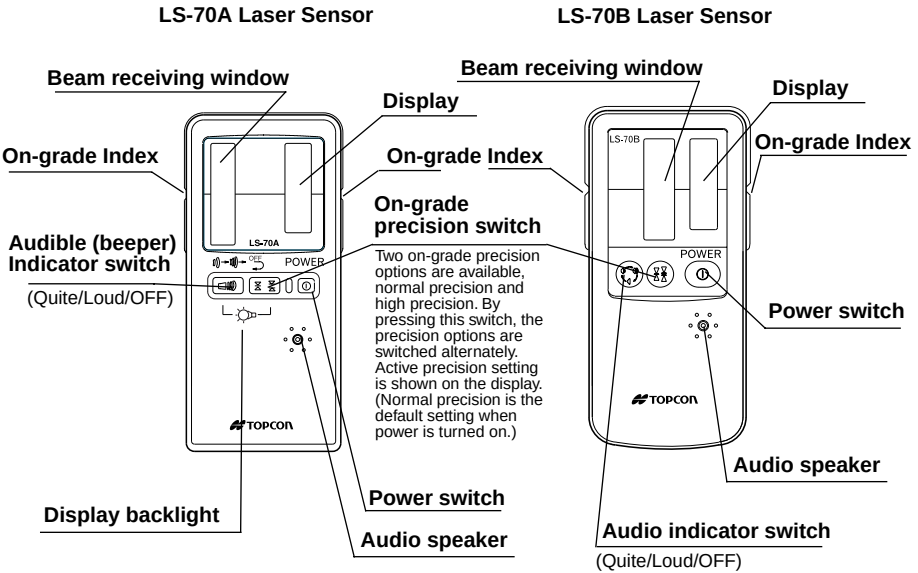
Always make sure instrument is completely dry before storing. Dry any moisture with a soft, clean cloth.

Standard / Optional Accessories

Laser sensor holder model 5



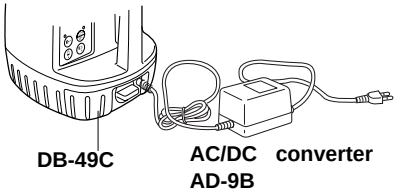
Holder Model 5 allows the laser sensor to be moved up or down on the staff by squeezing the spring-loaded clamp on its back side without removing the sensor from the staff.



Auto-cut off function (LS-70A and LS-70B)

The power will be turned off automatically if no laser beam is detected within approximately 30 minutes. (To turn the sensor on again, press the power switch.)

Battery holder DB-49C
Rechargeable battery pack BT-49Q
AC/DC converter AD-9B/7C
For Charging



1 Plug the AC/DC converter (AD-9B) into the DB-49C battery holder.

2 Insert the converter receptacle in an outlet (AD-9B is for AC120V)

3 Complete charging by unplugging the converter connector from the DB-49C battery holder after approximately 9 hours.

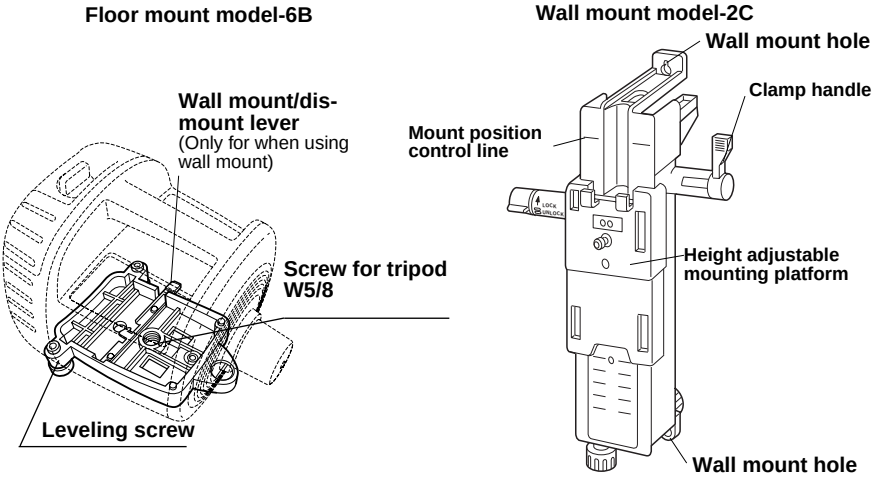
4 Unplug the converter receptacle from the outlet.

The LED of DB-49C will indicate charging status;

Red ON	:	Charging.
Green ON	:	Charging completed.
Green flashing	:	DB-49C is not connected to BT-49Q.
Red flashing	:	BT-49Q protection feature is working automatically. RL-VH3C can be used in this state.

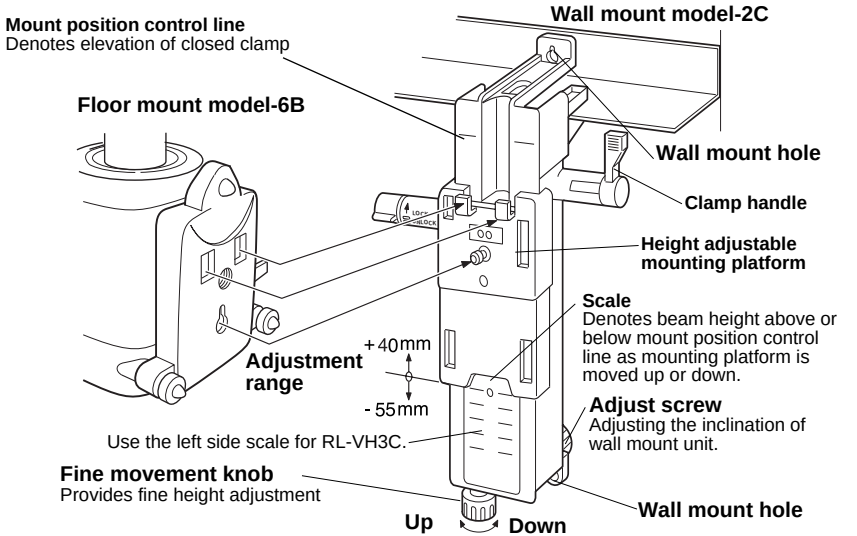
Automatic protection feature; In case of overcharge or high or low temperature state exceeding charging range, charging will be stopped or changed to protect battery.

Note	• DB-49C can be used with dry batteries instead of BT-49Q.

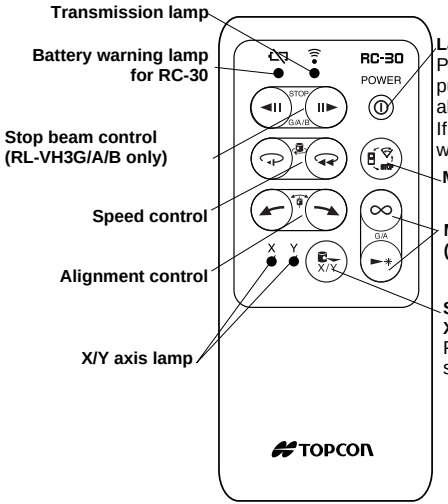


Floor Mount Model 6B must be installed on instrument in order to use Wall Mount Model 2C.

This is used to attach the instrument to wall molding or metal studs. Grip wall angle/molding or screw to studs and tighten the attachment screw securely.



RC-30 Remote Control (for remote compatible units only, see page 8)



Laser Power Switch (Standby mode)
Pressing this switch for more than three seconds puts laser in standby mode, allowing the user to conserve battery power.
If laser remains in standby mode for 2 hours, laser will turn off automatically.

Mode switch control

Manual focus control (RL-VH3G/A models only)

Slope mode / X/Y axis selection
Press this key for more than three seconds to set slope mode or select X or Y axis.

Description of RC-30 functions

Laser power switch (Standby mode)	Pressing for more than three seconds turns laser standby mode on or off. Laser turns off if standby mode continues for two hours.
Transmission lamp	This lamp will indicates a signal is being transmitted by the RC-30. It should illuminate any time a control pad is pressed.
Battery warning lamp for RC-30	Battery warning for RC-30. Replace the batteries with new ones.
Stop beam control	Sets Stop Beam mode and moves laser. (RL-VH3G/A/B models only)
Speed control	The rotation speed of the rotary head can be changed.
Alignment control	Moves beam up or down (horizontal rotation). Moves beam right or left (vertical rotation).
X/Y axis lamp	Indicates axis selected during beam sloping operation.
Laser Power switch (Standby mode)	Turns laser standby mode on or off by pressing this key for more than three seconds. (The RL-VH3C will be turned off automatically if the standby mode is continued for 2 hours)
Mode switch control	Laser mode is switched alternately as follows. Scan mode / Laser sensor mode / Laser pointing mode.
Manual focus control	Laser beam can be focused manually. (RL-VH3G/A models only)
X/Y axis selection	Sets slope mode by pressing for more than three seconds. Select X or Y axis for manual grading. To cancel the slope mode press this key for more than three seconds.

How to set remote control communication channel

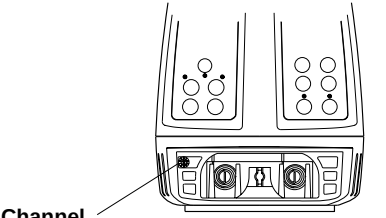
The same channel must be set on the RL-VH3C and the RC-30 remote controller.

RL-VH3C

1 Remove the battery cover by turning the battery compartment lock to “OPEN”.

2 Turn the channel switch to set a channel by using with a small straight screw-driver.

3 Replace the battery cover and turn the knob to “Lock”.

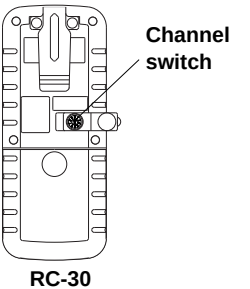


RC-30

1 Remove the rubber cover from the channel switch on the back of the RC-30.

2 Turn the channel switch to the same channel position set on the RL-VH3C.

3 Replace the rubber cover.



Specifications

Accuracy		
Horizontal	:	±20"
Vertical	:	±20"
Auto-leveling range	:	±5°
Measuring range (Diameter)	:	60m(197ft) Using with LS-70A/70B : 200m(656ft)
Diameter of visible beam	:	4.5mm
Rotation speeds	:	Changeable
Light source	:	L.D (Visible laser)
Power supply	:	4D-CELL dry batteries
Continuous operating time	:	Approx. 40 hours (+20°C)
Tripod screw	:	Flat and dome head type, 5"/8 × 11threads
Operating temperature	:	-20°C to +50°C (-4°F to +122°F)
Dimensions	:	182(L) × 167(W) × 229(H) mm [7.2(L) × 6.6(W) × 9.2(H) in]
Weight	:	1.9 kg [4.2 lbs] (without dry batteries) 2.5 kg [5.5 lbs] (with dry batteries)
Remote controller RC-30 (Option for remote compatible units only, see page 8)		
Operating range	:	Maximum 90m (295 ft)
Power supply	:	Three "AA" alkaline batteries, DC4.5V

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